STIC Search Report
EIC 1700

STIC Database Tracking Number: 196372

TO: Laura Weiner
Location: REM 6C83
Art Unit : 1745
July 26, 2006

Case Serial Number: 10/647541

From: Kathleen Fuller
Location: EIC 1700
REMSEN 4B28
Phone: 571/272-2505
Kathleen.Fuller@uspto.gov

Search Notes

BROAD SEARCH COVERING FORMULAS 1-8 AND ELECTROLYTE OR FROMULAS 1-8 AND FORMULA 9 AND ELECTROLYTE. ONLY 9 CA REFERENCES.

=> file reg
FILE 'REGISTRY' ENTERED AT 15:19:14 ON 26 JUL 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

Property values tagged with IC are from the ZIC/VINITI data file provided by InfoChem.

STRUCTURE FILE UPDATES: 25 JUL 2006 HIGHEST RN 895581-37-0
DICTIONARY FILE UPDATES: 25 JUL 2006 HIGHEST RN 895581-37-0

New CAS Information Use Policies, enter HELP USAGETERMS for details.

TSCA INFORMATION NOW CURRENT THROUGH January 6, 2006

Please note that search-term pricing does apply when conducting SmartSELECT searches.

REGISTRY includes numerically searchable data for experimental and predicted properties as well as tags indicating availability of experimental property data in the original document. For information on property searching in REGISTRY, refer to:

http://www.cas.org/ONLINE/UG/regprops.html

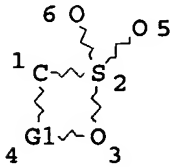
=> file hcapl
FILE 'HCAPLUS' ENTERED AT 15:19:18 ON 26 JUL 2006
USE IS SUBJECT TO THE TERMS OF YOUR STN CUSTOMER AGREEMENT.
PLEASE SEE "HELP USAGETERMS" FOR DETAILS.

FILE COVERS 1907 - 26 Jul 2006 VOL 145 ISS 5
FILE LAST UPDATED: 25 Jul 2006 (20060725/ED)

New CAS Information Use Policies, enter HELP USAGETERMS for details.

This file contains CAS Registry Numbers for easy and accurate substance identification.

=> d que
L3 STR



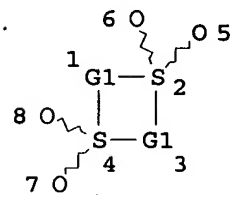
query covers all claims
1165 structures

```
REP G1=(1-10) A
NODE ATTRIBUTES:
CONNECT IS E1  RC AT   5
CONNECT IS E1  RC AT   6
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RSPEC I
NUMBER OF NODES IS   6

STEREO ATTRIBUTES: NONE
L5          1165 SEA FILE=REGISTRY SSS FUL L3
L6           947 SEA FILE=REGISTRY ABB=ON  L5 AND 1/S
L7           883 SEA FILE=REGISTRY ABB=ON  L6 NOT M/ELS
L9           218 SEA FILE=REGISTRY ABB=ON  L5 NOT L6
L12              STR
```

883 structures per claim 9-11 with one S=O =O



Subset search for broad claim covering 2 S=O in ring

121 structures

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REP G1=(1-5) A
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CONNECT IS E1  RC AT   5
CONNECT IS E1  RC AT   6
CONNECT IS E1  RC AT   7
CONNECT IS E1  RC AT   8
DEFAULT MLEVEL IS ATOM
DEFAULT ECLEVEL IS LIMITED

GRAPH ATTRIBUTES:
RSPEC I
NUMBER OF NODES IS   8

STEREO ATTRIBUTES: NONE
L17          121 SEA FILE=REGISTRY SUB=L5 SSS FUL L12
L18          114 SEA FILE=REGISTRY ABB=ON  L17 NOT M/ELS
L19          205 SEA FILE=HCAPLUS ABB=ON  L9
L20            7 SEA FILE=HCAPLUS ABB=ON  L19(L)ELECTROLYTE?
L21          134 SEA FILE=HCAPLUS ABB=ON  L18
L22            7 SEA FILE=HCAPLUS ABB=ON  L21(L)ELECTROLYTE?
L23         2653 SEA FILE=HCAPLUS ABB=ON  L7
L24           59 SEA FILE=HCAPLUS ABB=ON  L19 AND L23
L25            5 SEA FILE=HCAPLUS ABB=ON  L24 AND ELECTROLYTE?
L26            8 SEA FILE=HCAPLUS ABB=ON  L20 OR L22 OR L25
L27            9 SEA FILE=HCAPLUS ABB=ON  (L19 OR L21) AND ELECTROLYTE?
L28            9 SEA FILE=HCAPLUS ABB=ON  L27 OR L26
```

Claims formulas 1-8 and 9

Only 9 CA references for claim formulas 1-8 and electrolyte or 1-8 and 9 and electrolyte

```
=> d l28 1-9 bib abs ind hitstr

L28  ANSWER 1 OF 9  HCAPLUS  COPYRIGHT 2006 ACS on STN
AN   2005:888332  HCAPLUS
DN   143:250968
```

TI **Electrolyte** solutions containing cyclic sulfonate esters and secondary batteries using them
IN Kusachi, Yuki; Utsuki, Koji; Hasegawa, Etsuo
PA NEC Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 23 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2005228631	A2	20050825	JP 2004-37003	20040213
PRAI	JP 2004-37003		20040213		

OS MARPAT 143:250968
AB The **electrolyte** solns. contain aprotic solvents and cyclic sulfonate esters with up to 10 sulfonate groups linked by C1-5 alkylene or fluoroalkylene groups. The solns. stabilize solid **electrolyte** interphase (SEI) films, resulting in batteries, e.g., secondary Li batteries, showing a long charge-discharge cycle life.
IC ICM H01M010-40
ICS H01M004-02; H01M004-38; H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST cyclic sulfonate ester electrolytic soln lithium battery
IT Carboxylic acids, uses
RL: DEV (Device component use); USES (Uses)
(aliphatic, esters; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Sulfonic acids, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(alkanesulfonic, anhydrides; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Sulfonic acids, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(cyclic sulfonic acid esters; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Ethers, uses
RL: DEV (Device component use); USES (Uses)
(cyclic; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Battery anodes
Battery cathodes
Battery **electrolytes**
Electrolytic solutions
(electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Carbonates, uses
Ethers, uses
RL: DEV (Device component use); USES (Uses)
(electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Secondary batteries
(lithium; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)
IT Lactones
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(sultones, γ-; electrolytic solns. containing aprotic solvents and

cyclic sulfonate esters for secondary batteries)

IT Lactones
RL: DEV (Device component use); USES (Uses)
(γ-; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(amorphous, anode active mass; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

IT 7439-93-2, Lithium, uses 7782-42-5, Graphite, uses
RL: DEV (Device component use); USES (Uses)
(anode active mass; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

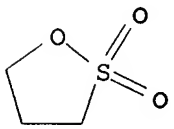
IT 12057-17-9, Lithium manganese oxide (LiMn2O4) 508200-28-0, Lithium manganese nickel titanium oxide (LiMn1.35Ni0.5Ti0.1504)
RL: DEV (Device component use); USES (Uses)
(cathode active mass; electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 872-36-6, Vinylene carbonate 3145-91-3, Lithium tetrachloroaurate 7791-03-9, Lithium perchlorate 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate
RL: DEV (Device component use); USES (Uses)
(electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

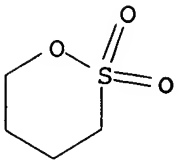
IT 126-33-0, Sulfolane **1120-71-4**, 1,3-Propanesultone **1633-83-6**, 1,4-Butanesultone 28452-93-9D, Sulfolene, derivs. **863198-22-5 863198-23-6 863198-24-7**
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

IT **1120-71-4**, 1,3-Propanesultone **1633-83-6**, 1,4-Butanesultone **863198-22-5 863198-23-6 863198-24-7**
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(electrolytic solns. containing aprotic solvents and cyclic sulfonate esters for secondary batteries)

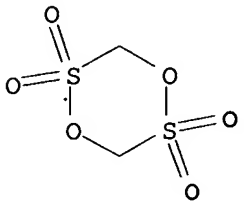
RN 1120-71-4 HCAPLUS
CN 1,2-Oxathiolane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



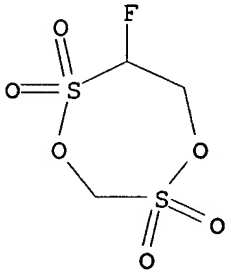
RN 1633-83-6 HCAPLUS
CN 1,2-Oxathiane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



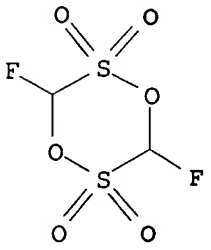
RN 863198-22-5 HCAPLUS
CN 1,4,2,5-Dioxadithiane, 2,2,5,5-tetraoxide (9CI) (CA INDEX NAME)



RN 863198-23-6 HCAPLUS
CN 1,4,2,5-Dioxadithiepane, 6-fluoro-, 2,2,5,5-tetraoxide (9CI) (CA INDEX NAME)



RN 863198-24-7 HCAPLUS
CN 1,4,2,5-Dioxadithiane, 3,6-difluoro-, 2,2,5,5-tetraoxide (9CI) (CA INDEX NAME)

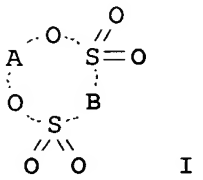


L28 ANSWER 2 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:822793 HCAPLUS
DN 143:232664
TI **Electrolytes** for secondary lithium batteries, and same batteries

IN Utsuki, Koji; Kusachi, Yuki
PA NEC Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 24 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2005222846	A2	20050818	JP 2004-30661	20040206
PRAI JP 2004-30661		20040206		

OS MARPAT 143:232664
GI



I

AB The **electrolytes** contain nonprotonic solvents and 0.1-5.0 weight% of cyclic disulfonic acid esters, and the content of chlorine in the **electrolytes** is suppressed to <150 ppm. Preferably, the esters are expressed by I [A = (branched) (substituted) C1-5 alkylene, carbonyl, sulfinyl, (branched) perfluoroalkylene, etc.; B = (branched) (substituted) alkylene]. The esters provide protective films on electrode so as to prevent the electrodes from reaction with **electrolyte** solvents, so that secondary lithium batteries employing the **electrolytes** show high storage stability, and excellent charge-discharge cycling performance.
IC ICM H01M010-40
ICS H01M004-02; H01M004-38; H01M004-48; H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 28
ST lithium battery **electrolyte** cyclic disulfonic acid ester; alkylenedisulfonic acid cyclic ester battery **electrolyte**
IT Carbonates, uses
Ethers, uses
RL: DEV (Device component use); USES (Uses)
(**electrolyte** components; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)
IT Carboxylic acids, uses
RL: DEV (Device component use); USES (Uses)
(esters, aliphatic, **electrolyte** components; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)
IT Battery **electrolytes**
(lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)
IT Secondary batteries
(lithium; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)
IT Lactones
RL: DEV (Device component use); USES (Uses)
(γ-, aliphatic, **electrolyte** components; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)
IT 7791-03-9, Lithium perchlorate 14024-11-4, Aluminum lithium chloride

(AlLiCl4) 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate
RL: DEV (Device component use); USES (Uses)
(**electrolyte** components; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)

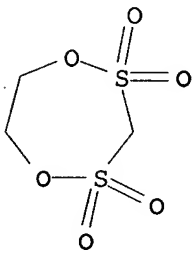
IT **99591-73-8P 99591-74-9P**
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(**electrolyte** components; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)

IT 5799-68-8P, Methanedisulfonyl dichloride 71608-87-2P
RL: IMF (Industrial manufacture); RCT (Reactant); PREP (Preparation); RACT (Reactant or reagent)
(in preparation of cyclic disulfonic acid esters for lithium secondary battery **electrolytes**)

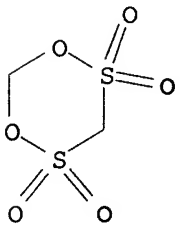
IT 75-11-6, Diiodomethane 107-21-1, Ethylene glycol, reactions 534-16-7, Silver carbonate 7790-94-5, Chlorosulfonic acid 10025-87-3, Phosphorus oxychloride
RL: RCT (Reactant); RACT (Reactant or reagent)
(in preparation of cyclic disulfonic acid esters for lithium secondary battery **electrolytes**)

IT **99591-73-8P 99591-74-9P**
RL: DEV (Device component use); IMF (Industrial manufacture); PREP (Preparation); USES (Uses)
(**electrolyte** components; lithium secondary battery **electrolytes** containing cyclic disulfonic acid esters)

RN 99591-73-8 HCAPLUS
CN 1,5,2,4-Dioxadithiepane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



RN 99591-74-9 HCAPLUS
CN 1,5,2,4-Dioxadithiane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



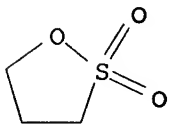
L28 ANSWER 3 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:547843 HCAPLUS
DN 143:81122

TI lithium secondary battery
IN Miyachi, Mariko; Utsugi, Koji; Kusachi, Yuki; Yamamoto, Hironori
PA NEC Corporation, Japan
SO PCT Int. Appl., 95 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 3

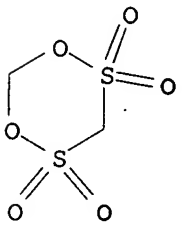
	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005057715	A1	20050623	WO 2004-JP18715	20041215
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	JP 2005203341	A2	20050728	JP 2004-317279	20041029
	JP 2005203342	A2	20050728	JP 2004-317281	20041029
	JP 2005203343	A2	20050728	JP 2004-317297	20041029
	JP 2006156314	A2	20060615	JP 2004-363498	20041215
	JP 2006156315	A2	20060615	JP 2004-363502	20041215
PRAI	JP 2003-416516	A	20031215		
	JP 2004-317280	A	20041029		
	JP 2004-317298	A	20041029		
	JP 2004-317278	A	20041029		
	JP 2004-317299	A	20041029		

OS MARPAT 143:81122
AB The present invention aims to provide a lithium secondary battery with excellent characteristics such as energy d. and electromotive force, which is also excellent in cycle life and shelf life stability. Disclosed is a secondary battery comprising at least a pos. electrode, a neg. electrode and an **electrolyte** solution wherein the neg. electrode contains a metal, metalloid or oxide, which adsorbs/desorbs an alkali metal or alkaline earth metal, and a carbon material as the neg. electrode active material, and the **electrolyte** solution contains a non-protonic solvent wherein at least an **electrolyte** is dissolved and a chain disulfone compound
IC ICM H01M010-40
ICS H01M004-02; H01M004-38; H01M004-48; H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST lithium secondary battery anode active substance **electrolyte** additive disulfone
IT Battery anodes
(anode active substances for)
IT Secondary batteries
(lithium; additives for)
IT Battery **electrolytes**
(nonaq.; disulfone additives for)
IT 872-36-6, Vinylene carbonate **1120-71-4**, Propane sultone 2997-54-8 6330-39-8 22063-27-0 22063-28-1 23601-06-1 **99591-74-9** 152949-20-7 500878-47-7 855472-38-7 855472-43-4 855472-46-7
RL: MOA (Modifier or additive use); USES (Uses)

(additives for lithium non-aqueous **electrolyte** solution)
IT 1303-86-2, Boron oxide (B2O3), uses 1309-37-1, Ferric oxide, uses 1314-56-3, Phosphorus oxide (P2O5), uses 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-92-1, Lead, uses 7440-02-0, Nickel, uses 7440-21-3, Silicon, uses 7440-22-4, Silver, uses 7440-31-5, Tin, uses 7440-32-6, Titanium, uses 7440-36-0, Antimony, uses 7440-50-8, Copper, uses 7440-56-4, Germanium, uses 7782-42-5, Graphite, uses 12023-55-1, Iron silicide (Fe3Si7) 12031-95-7, Lithium titanium oxide (Li4Ti5O12) 12036-84-9, Tungsten oxide (W2O5) 12042-55-6, Aluminum silicide (AlSi) 12334-14-4, Tin silicide (SnSi) 18282-10-5, Tin dioxide 21651-19-4, Tin monoxide 39445-33-5 53095-76-4, Lithium silicide (LiSi) 113443-18-8, Silicon oxide (SiO) 160479-36-7, Lithium tin oxide 178958-56-0, Lithium silicon oxide 855472-17-2, Iron silicide (FeSi19) 855472-21-8, Aluminum nickel silicide (Al9NiSi10) 855472-26-3, Tin titanium silicide (SnTi18Si) 855475-31-9
RL: TEM (Technical or engineered material use); USES (Uses)
(anode active substance for lithium secondary batteries)
IT **1120-71-4**, Propane sultone **99591-74-9**
RL: MOA (Modifier or additive use); USES (Uses)
(additives for lithium non-aqueous **electrolyte** solution)
RN 1120-71-4 HCAPLUS
CN 1,2-Oxathiolane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



RN 99591-74-9 HCAPLUS
CN 1,5,2,4-Dioxadithiane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 4 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:547842 HCAPLUS
DN 143:81121
TI **Electrolyte** solution for secondary lithium battery and the battery
IN Utsugi, Koji; Kusachi, Yuki; Katou, Tsuyoshi
PA NEC Corporation, Japan
SO PCT Int. Appl., 55 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 3

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2005057714	A1	20050623	WO 2004-JP18698	20041215
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW				
	RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	JP 2005203341	A2	20050728	JP 2004-317279	20041029
	JP 2005203342	A2	20050728	JP 2004-317281	20041029
	JP 2005203343	A2	20050728	JP 2004-317297	20041029
	CN 1757134	A	20060405	CN 2004-80005513	20041215
	JP 2006156314	A2	20060615	JP 2004-363498	20041215
	JP 2006156315	A2	20060615	JP 2004-363502	20041215
PRAI	JP 2003-416516	A	20031215		
	JP 2004-317301	A	20041029		
	JP 2004-317278	A	20041029		
	JP 2004-317299	A	20041029		

OS MARPAT 143:81121

AB The **electrolyte** solution has an **electrolyte** dissolved in an aprotic solvent and contains a disulfone R3-SO2-CR1R4-SO2-R2, where R1-4 are various hydrocarbon groups which may also contain F, O, S, and N.

IC ICM H01M010-40
ICS H01M004-02; H01M004-38; H01M004-58; H01G009-038; H01L031-04; H01M014-00

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary lithium battery **electrolyte** disulfone additive

IT Battery **electrolytes**
(**electrolyte** solns. containing disulfone additives for secondary lithium batteries)

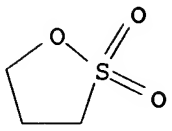
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 21324-40-3, Lithium hexafluorophosphate
RL: DEV (Device component use); USES (Uses)
(**electrolyte** solns. containing disulfone additives for secondary lithium batteries)

IT 872-36-6, Vinylene carbonate **1120-71-4**, 1,3-Propanesultone **1633-83-6**, 1,4-Butanesultone 2997-54-8 6330-39-8 22063-27-0 22063-28-1 23601-06-1 **99591-74-9** 152949-20-7 500878-47-7 855472-38-7 855472-43-4 855472-46-7
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solns. containing disulfone additives for secondary lithium batteries)

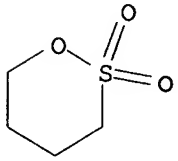
IT **1120-71-4**, 1,3-Propanesultone **1633-83-6**, 1,4-Butanesultone **99591-74-9**
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solns. containing disulfone additives for secondary lithium batteries)

RN 1120-71-4 HCAPLUS

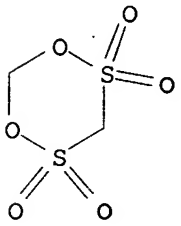
CN 1,2-Oxathiolane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



RN 1633-83-6 HCAPLUS
CN 1,2-Oxathiane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



RN 99591-74-9 HCAPLUS
CN 1,5,2,4-Dioxadithiane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 5 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2005:283747 HCAPLUS
DN 142:358030
TI Secondary nonaqueous **electrolyte** battery
IN Kusachi, Yuki; Utsugi, Koji
PA NEC Corporation, Japan
SO PCT Int. Appl., 34 pp.
CODEN: PIXXD2
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI WO 2005029613	A1	20050331	WO 2004-JP11534	20040811

W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW
RW: BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE,

SI, SK, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG

PRAI JP 2003-322968 A 20030916

AB The battery has an anode whose surface is provided with a substance having a peak at 162.9-164.0 eV according to XPS anal.

IC ICM H01M004-02
ICS H01M010-40; H01M004-38; H01M004-58

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST secondary battery anode surface **electrolyte** deposition XPS characteristic; battery **electrolyte** org sulfur contg compd

IT Battery anodes
Battery **electrolytes**
(**electrolytes** having organic S containing compds. for secondary lithium batteries)

IT Secondary batteries
(lithium; **electrolytes** having organic S containing compds. for secondary lithium batteries)

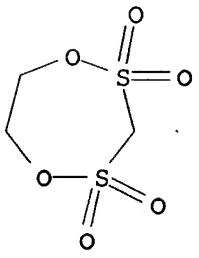
IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(amorphous; **electrolytes** having organic S containing compds. for secondary lithium batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 12057-17-9, Lithium manganese oxide (LiMn2O4) 21324-40-3, Lithium hexafluorophosphate **99591-73-8** **99591-74-9**
RL: DEV (Device component use); USES (Uses)
(**electrolytes** having organic S containing compds. for secondary lithium batteries)

IT **99591-73-8** **99591-74-9**
RL: DEV (Device component use); USES (Uses)
(**electrolytes** having organic S containing compds. for secondary lithium batteries)

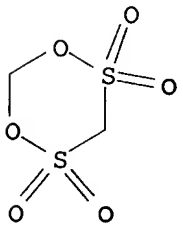
RN 99591-73-8 HCAPLUS

CN 1,5,2,4-Dioxadithiepane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



RN 99591-74-9 HCAPLUS

CN 1,5,2,4-Dioxadithiane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)

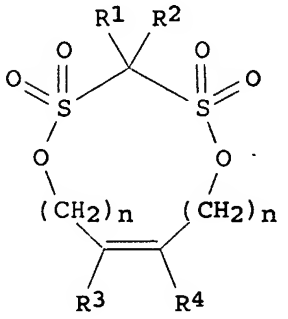


RE.CNT 17 THERE ARE 17 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 6 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:823614 HCAPLUS
DN 141:334876
TI **Electrolyte** solution for secondary battery and the battery
IN Kusachi, Yuki; Utsuki, Koji
PA NEC Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 27 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI JP 2004281325	A2	20041007	JP 2003-74054	20030318
PRAI JP 2003-74054		20030318		

OS MARPAT 141:334876
GI



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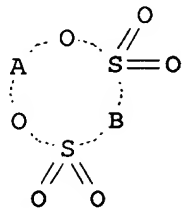
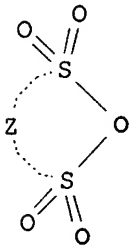
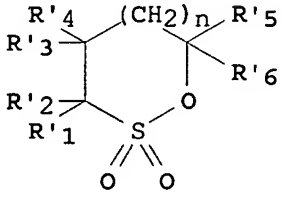


II



III

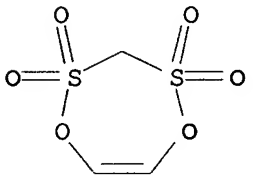


IV

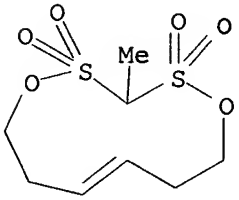
AB The **electrolyte** solution contains an aprotic solvent and an unsatd. cyclic disulfonate ester I, where R1-R4 = H, Me, Et, or halogen and n = integer 0-2. The **electrolyte** solution may also contain II [A = (substituted) C1-5 (fluoro)alkylene, carbonyl, sulfinyl, or bivalent C2-6 group containing ether bond connected (fluoro)alkylene units; B = (substituted) alkylene group], III [Z = (substituted) C2-4 alkylene, alkenylene, aromatic or heterocyclic group], or IV (n = integer 0-2, R'1-R'6 = H C1-12 alkyl, C3-6 cycloalkyl, or C6-12 aryl group). The battery is a secondary Li battery.

IC ICM H01M010-40
ICS H01M004-58

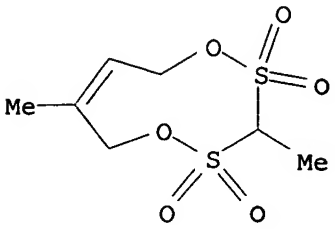
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST secondary lithium battery **electrolyte** soln cyclic disulfonate ester
IT Battery **electrolytes**
(**electrolyte** solns. containing cyclic disulfonate esters and other additives for secondary lithium batteries)
IT **769973-24-2 769973-25-3 769973-26-4 769973-27-5**
RL: MOA (Modifier or additive use); USES (Uses)
(cyclic disulfonate ester containing secondary lithium battery **electrolyte** solns.)
IT 872-36-6, Vinylene carbonate **1120-71-4**, 1,3-Propanesultone 14913-52-1, Neodymium ion (Nd3+), uses 18472-30-5, Erbium ion (Er3+), uses 22541-18-0, Europium ion (Eu3+), uses 22541-22-6, Holmium ion (Ho3+), uses 259194-36-0 259194-40-6 634598-36-0 634598-37-1
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solns. containing cyclic disulfonate esters and other additives for secondary lithium batteries)
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 21324-40-3, Lithium hexafluorophosphate 132843-44-8
RL: DEV (Device component use); USES (Uses)
(**electrolyte** solns. containing cyclic disulfonate esters for secondary lithium batteries)
IT **769973-24-2 769973-25-3 769973-26-4 769973-27-5**
RL: MOA (Modifier or additive use); USES (Uses)
(cyclic disulfonate ester containing secondary lithium battery **electrolyte** solns.)
RN 769973-24-2 HCAPLUS
CN 1,5,2,4-Dioxadithiepin, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



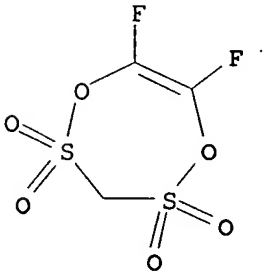
RN 769973-25-3 HCAPLUS
CN 1,5-Dioxa-2,4-dithiacycloundec-8-ene, 3-methyl-, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



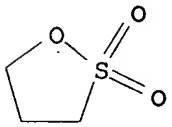
RN 769973-26-4 HCAPLUS
CN 1,5,2,4-Dioxadithionin, 6,9-dihydro-3,7-dimethyl-, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



RN 769973-27-5 HCAPLUS
CN 1,5,2,4-Dioxadithiepin, 6,7-difluoro-, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



IT **1120-71-4**, 1,3-Propanesultone
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solns. containing cyclic disulfonate esters and other additives for secondary lithium batteries)
RN 1120-71-4 HCAPLUS
CN 1,2-Oxathiolane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



L28 ANSWER 7 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:181920 HCAPLUS
DN 140:184814
TI **Electrolyte** solution for secondary battery
IN Utsugi, Koji; Kusachi, Yuki; Yamazaki, Ikiko
PA NEC Corporation, Japan
SO Eur. Pat. Appl., 35 pp.
CODEN: EPXXDW
DT Patent
LA English
FAN.CNT 1

applicant

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1394888	A1	20040303	EP 2003-90268	20030822
	EP 1394888	B1	20060412		

R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,

IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK

	JP 2004281368	A2	20041007	JP 2003-289432	20030807
	US 2004043300	A1	20040304	US 2003-647541	20030826
	KR 2004019994	A	20040306	KR 2003-59849	20030828
	CN 1495959	A	20040512	CN 2003-132755	20030829
PRAI	JP 2002-250441	A	20020829		
	JP 2003-52588	A	20030228		
	JP 2003-289432	A	20030807		

AB The present invention provides a technol. of inhibiting the decomposition of the solvent of the **electrolyte** solution for a secondary battery. Further, the present invention provides a technol. of prohibiting the resistance increase of a secondary battery and improving the storage properties such as improving the capacity retention ratio. An **electrolyte** solution comprising non-proton solvent and cyclic sulfonic ester including at least two sulfonyl groups may be used.

IC ICM H01M010-40
ICS H01M006-16

CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)

ST **electrolyte** soln secondary battery

IT Ethers, uses
RL: DEV (Device component use); USES (Uses)
(cyclic; **electrolyte** solution for secondary battery)

IT Battery **electrolytes**
(**electrolyte** solution for secondary battery)

IT Ethers, uses
Rare earth complexes
Transition metal complexes
RL: DEV (Device component use); USES (Uses)
(**electrolyte** solution for secondary battery)

IT Carboxylic acids, uses
RL: DEV (Device component use); USES (Uses)
(esters, aliphatic; **electrolyte** solution for secondary battery)

IT Sulfonic acids, uses
RL: DEV (Device component use); USES (Uses)
(esters, cyclic; **electrolyte** solution for secondary battery)

IT Secondary batteries
(lithium; **electrolyte** solution for secondary battery)

IT Lactones
RL: DEV (Device component use); USES (Uses)
(γ-; **electrolyte** solution for secondary battery)

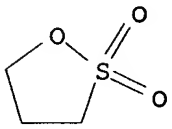
IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 463-79-6D, Carbonic acid, ester, cyclic 463-79-6D, Carbonic acid, ester, linear 497-62-1 872-36-6, Vinylene carbonate 7429-90-5, Aluminum, uses 7439-93-2, Lithium, uses 7440-00-8D, Neodymium, complex 7440-44-0, Carbon, uses 7440-52-0D, Erbium, complex 7440-53-1D, Europium, complex 7440-60-0D, Holmium, complex 7782-42-5, Graphite, uses 7791-03-9, Lithium perchlorate 12057-17-9, Lithium manganese oxide limn2o4 14024-11-4, Lithium tetrachloroaluminate 14283-07-9, Lithium tetrafluoroborate 18424-17-4, Lithium hexafluoroantimonate 21324-40-3, Lithium hexafluorophosphate 29935-35-1, Lithium hexafluoroarsenate 113066-89-0, Cobalt lithium nickel oxide Co0.2LiNi0.8O2 132843-44-8
RL: DEV (Device component use); USES (Uses)
(**electrolyte** solution for secondary battery)

IT **1120-71-4**, 1,3-Propanesultone 14913-52-1, Neodymium(3+), uses 18472-30-5, Erbium(3+), uses 22541-18-0, Europium(3+), uses 22541-22-6, Holmium(3+), uses 37181-39-8, Triflate **99591-73-8** **99591-74-9** **99591-80-7** 259194-36-0 259194-40-6 634598-36-0 634598-37-1 **659737-87-8** **659737-88-9** **659737-89-0** **659737-90-3**

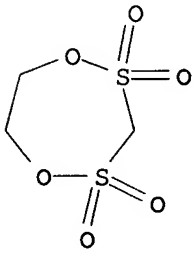
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solution for secondary battery)

IT **1120-71-4**, 1,3-Propanesultone **99591-73-8**
99591-74-9 99591-80-7 659737-87-8
659737-88-9 659737-89-0 659737-90-3
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solution for secondary battery)

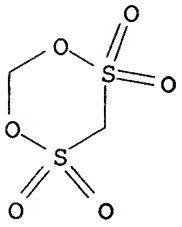
RN 1120-71-4 HCAPLUS
CN 1,2-Oxathiolane, 2,2-dioxide (8CI, 9CI) (CA INDEX NAME)



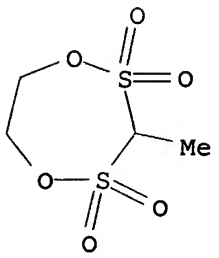
RN 99591-73-8 HCAPLUS
CN 1,5,2,4-Dioxadithiepane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



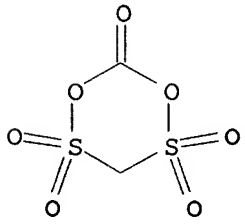
RN 99591-74-9 HCAPLUS
CN 1,5,2,4-Dioxadithiane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



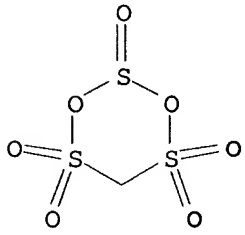
RN 99591-80-7 HCAPLUS
CN 1,5,2,4-Dioxadithiepane, 3-methyl-, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



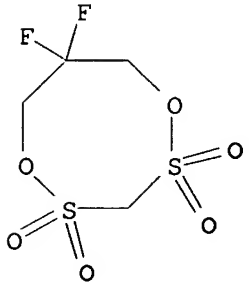
RN 659737-87-8 HCAPLUS
CN 1,5,2,4-Dioxadithian-6-one, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



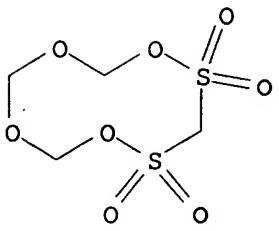
RN 659737-88-9 HCAPLUS
CN 1,3,2,4,6-Dioxatrithiane, 2,4,4,6,6-pentaoxide (9CI) (CA INDEX NAME)



RN 659737-89-0 HCAPLUS
CN 1,5,2,4-Dioxadithiocane, 7,7-difluoro-, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)



RN 659737-90-3 HCAPLUS
CN 1,5,7,9,2,4-Tetroxadithiecane, 2,2,4,4-tetraoxide (9CI) (CA INDEX NAME)

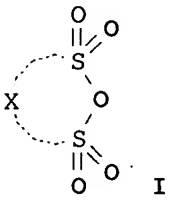


RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
ALL CITATIONS AVAILABLE IN THE RE FORMAT

L28 ANSWER 8 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 2004:57903 HCAPLUS
DN 140:131080
TI **Electrolyte** solution for the secondary battery and the battery using the solution
IN Utsuki, Koji; Mori, Mitsuhiro
PA NEC Corp., Japan
SO Jpn. Kokai Tokkyo Koho, 24 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2004022336	A2	20040122	JP 2002-175648	20020617
PRAI	JP 2002-175648		20020617		

GI



I

AB The **electrolyte** solution has a sulfonic acid anhydride I [X = (substituted) C2-4 alkylene, (substituted) C2-4 alkenyl, or (substituted) aromatic ring] in an aprotic solvent. The battery has a cathode, an anode, and the above **electrolyte** solution
IC ICM H01M010-40
ICS H01M004-02; H01M004-58
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
ST secondary battery **electrolyte** sulfonic acid anhydride
IT Battery **electrolytes**
Secondary batteries
(**electrolyte** solns. containing sulfonic acid anhydrides for secondary batteries)
IT 7440-44-0, Carbon, uses
RL: DEV (Device component use); USES (Uses)
(amorphous; anode; **electrolyte** solns. containing sulfonic acid anhydrides for secondary batteries)
IT 7439-93-2, Lithium, uses 7782-42-5, Graphite, uses

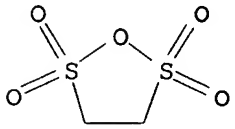
RL: DEV (Device component use); USES (Uses)
(anode; **electrolyte** solns. containing sulfonic acid anhydrides for secondary batteries)

IT 96-49-1, Ethylene carbonate 105-58-8, Diethyl carbonate 108-32-7, Propylene carbonate 12057-17-9, Lithium manganese oxide (LiMn2O4) 21324-40-3, Lithium hexafluorophosphate 33356-82-0 132843-44-8
RL: DEV (Device component use); USES (Uses)
(**electrolyte** solns. containing sulfonic acid anhydrides for secondary batteries)

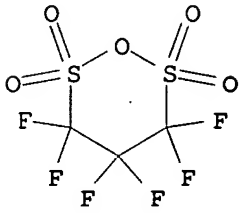
IT 872-36-6, Vinylene carbonate **4378-87-4** 76076-58-9 **82727-20-6** 259194-36-0 259194-40-6 634598-36-0 634598-37-1 648922-25-2 648922-26-3 648922-27-4
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solns. containing sulfonic acid anhydrides for secondary batteries)

IT **4378-87-4 82727-20-6**
RL: MOA (Modifier or additive use); USES (Uses)
(**electrolyte** solns. containing sulfonic acid anhydrides for secondary batteries)

RN 4378-87-4 HCAPLUS
CN 1,2,5-Oxadithiolane, 2,2,5,5-tetraoxide (9CI) (CA INDEX NAME)



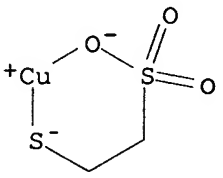
RN 82727-20-6 HCAPLUS
CN 1,2,6-Oxadithiane, 3,3,4,4,5,5-hexafluoro-, 2,2,6,6-tetraoxide (9CI) (CA INDEX NAME)



L28 ANSWER 9 OF 9 HCAPLUS COPYRIGHT 2006 ACS on STN
AN 1990:167909 HCAPLUS
DN 112:167909
TI Bath for electrodeposition of smooth copper layers
IN Loewe, Holger; Schmidt, Helge; Kiessling, Sabine; Vieweger, Ulrich; Schmidt, Cordt; Liebscher, Heinz; Kurz, Stefan
PA Technische Hochschule Ilmenau, Ger. Dem. Rep.
SO Ger. (East), 7 pp.
CODEN: GEXXA8
DT Patent
LA German
FAN.CNT 1

PATENT NO.	KIND	DATE	APPLICATION NO.	DATE

PI DD 269068 A3 19890621 DD 1987-301490 19870406
PRAI DD 1987-301490 19870406
OS MARPAT 112:167909
AB The bath contains a H2SO4-containing CuSO4 **electrolyte** and a S-containing organic H2O-soluble additive. The additive, at a concentration of 0.01-100 mg/L, permits a constant deposition of smooth or bright and ductile Cu layers when used with inert anode materials and at c.d. ≤1000 A/dm2.
IC ICM C25D003-38
CC 72-8 (Electrochemistry)
ST smooth copper layer electrodeposition bath
IT **126285-75-4** 126397-51-1 126397-53-3 126397-54-4 126397-55-5
RL: PRP (Properties)
(electrodeposition of smooth copper layers from baths containing)
IT 7440-50-8, Copper, uses and miscellaneous
RL: USES (Uses)
(electrodeposition of smooth layers of, bath for)
IT **126285-75-4**
RL: PRP (Properties)
(electrodeposition of smooth copper layers from baths containing)
RN 126285-75-4 HCAPLUS
CN Cuprate(1-), [2-mercaptoethanesulfonato(2-)-O1,S2]-, potassium (9CI) (CA INDEX NAME)



● K^+

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